

What is claimed is

1           1. A nonlinear broadcast system that broadcasts material  
2   data by executing a plurality of transfer processes of the  
3   material data for broadcast in parallel for at least a certain  
4   duration, the transfer processes for broadcast utilizing a  
5   common hardware resource, the nonlinear broadcast system  
6   comprising:

7           material storage means storing the material data;  
8           duration information storage means storing duration  
9   information showing durations, in each of which a different  
10   one of the transfer processes for broadcast is scheduled to  
11   be executed;

12           first allocation means for allocating a required amount  
13   of the hardware resource to each transfer process for broadcast,  
14   for the corresponding duration shown by the duration  
15   information;

16           available amount calculation means for calculating an  
17   available amount of the hardware resource remaining after  
18   the first allocation means has allocated the required amount  
19   to each transfer process for broadcast;

20           second allocation means for allocating, to one or more  
21   background transfer processes that are processes other than  
22   the transfer processes for broadcast, as much amount of the  
23   hardware resource as possible, so as not to exceed the  
24   calculated available amount; and

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25 process execution means for executing (a) each transfer  
26 process for broadcast utilizing the amount of hardware  
27 resource allocated by the first allocation means, and (b)  
28 each background transfer process utilizing the amount of  
29 hardware resource allocated by the second allocation means.

1 2. The nonlinear broadcast system of Claim 1,  
2 wherein the available amount calculation means  
3 calculates the available amount of the hardware resource,  
4 every time when one of a start time and an end time of each  
5 duration shown by the duration information is reached.

1 3. The nonlinear broadcast system of Claim 2,  
2 wherein the material storage means is a readable and  
3 writable recording medium,

4 the hardware resource is a band for an access to the  
5 recording medium,

6 the first allocation means allocates a required  
7 bandwidth of the band to each transfer process for broadcast,

8 the available amount calculation means calculates an  
9 available bandwidth by subtracting the bandwidth allocated  
10 to each transfer process for broadcast by the first allocation  
11 means from a total bandwidth of the band for the access to  
12 the recording medium,

13 the second allocation means allocates, to each

14 background transfer process, as much bandwidth of the band  
15 as possible, so as not to exceed the calculated available  
16 bandwidth, and

17 the process execution means executes (a) each transfer  
18 process for broadcast utilizing the bandwidth allocated by  
19 the first allocation means, and (b) each background transfer  
20 process utilizing the bandwidth allocated by the second  
21 allocation means.

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1 4. The nonlinear broadcast system of Claim 3,  
2 wherein each background transfer process is a process  
3 for writing the material data to the recording medium, and  
4 each transfer process for broadcast is a process for  
5 reading the material data from the recording medium.

1 5. The nonlinear broadcast system of Claim 4,  
2 wherein the material data is video data,  
3 the recording medium is a hard disc, and  
4 the nonlinear broadcast system comprises:  
5 a transmitting device for converting the video data so  
6 as to be in a broadcast format, and broadcasting the converted  
7 video data;

8 a plurality of nonlinear editing devices each being  
9 provided so as to correspond to one hard disc and including  
10 a coder-decoder, the first allocation means, the second

11 allocation means, the available amount calculation means,  
12 and the process execution means, the process execution means  
13 executing each transfer process for broadcast for reading  
14 the video data from the hard disc corresponding to the nonlinear  
15 editing device and outputting the read video data via the  
16 coder-decoder; and

17 a switcher for selecting video data, out of video data  
18 outputted by each of the nonlinear editing devices, and sending  
19 the selected video data to the transmitting device.

1 6. The nonlinear broadcast system of Claim 5,  
2 wherein each nonlinear editing device further includes  
3 effect addition means for adding an effect to the video  
4 data when the video data is outputted via the coder-decoder.

1 7. The nonlinear broadcast system of Claim 4, further  
2 comprising  
3 transfer complete time display means for obtaining an  
4 amount of data to be transferred by each background transfer  
5 process, calculating a time at which the background transfer  
6 process is to be completed, based on the bandwidth allocated  
7 by the second allocation means, and displaying the calculated  
8 time.

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1 8. The nonlinear broadcast system of Claim 3,

2 wherein each transfer process for broadcast is a process  
3 for reading the material data from the recording medium,  
4 organizing the read material data so as to be in a format  
5 suitable for a streaming-type delivery, and performing the  
6 streaming-type delivery, and

7 each background transfer process is a process for reading  
8 the material data from the recording medium, organizing the  
9 read material data so as to be in a format suitable for a  
10 download-type delivery, and performing the down-load type  
11 delivery.

1 9. The nonlinear broadcast system of Claim 1,

2 wherein the available amount calculation means  
3 calculates the available amount, every time when one of (a)  
4 a time that is a predetermined duration before a start time  
5 of each duration shown by the duration information and (b)  
6 an end time of each duration shown by the duration information  
7 is reached.

1 10. A hardware resource allocation method for performing  
2 hardware resource allocation for processes, in a nonlinear  
3 broadcast system in which material data are broadcasted by  
4 executing a plurality of transfer processes of the material  
5 data for broadcast in parallel for at least a certain duration,

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the transfer processes for broadcast utilizing a common hardware resource,

the nonlinear broadcast system including material storage means storing the material data and duration information storage means storing duration information showing durations, in each of which a different one of the transfer processes for broadcast is scheduled to be executed,

the hardware resource allocation method comprising: a first allocation step for allocating a required amount of the hardware resource to each transfer process for broadcast for the corresponding duration shown by the duration information;

an available amount calculation step for calculating an available amount of the hardware resource remaining after the required amount has been allocated to each transfer process for broadcast in the first allocation step; and

a second allocation step for allocating, to one or more background transfer processes that are processes other than the transfer processes for broadcast, as much amount of the hardware resource as possible, so as not to exceed the calculated available amount.

11. The hardware resource allocation method of Claim 10, wherein in the available amount calculation step, the

4 available amount of the hardware resource is calculated every  
5 time when one of a start time and an end time of each duration  
6 shown by the duration information is reached.

1 12. The hardware resource allocation method of Claim  
2 11,

3 wherein the material storage means included in the  
4 nonlinear broadcast system is a readable and writable  
5 recording medium,

6 the hardware resource is a band for an access to the  
7 recording medium,

8 in the first allocation step, a required bandwidth of  
9 the band is allocated to each transfer process for broadcast,

10 in the available amount calculation step, an available  
11 bandwidth is calculated by subtracting the bandwidth  
12 allocated to each transfer process for broadcast in the first  
13 allocation step from a total bandwidth of the band for the  
14 access to the recording medium, and

15 in the second allocation step, as much bandwidth of the  
16 band as possible is allocated to each background transfer  
17 process, so as not to exceed the calculated available bandwidth.

1 13. The hardware resource allocation method of Claim  
2 12,

3 wherein each background transfer process is a process

4 for writing the material data to the recording medium, and  
5 each transfer process for broadcast is a process for  
6 reading the material data from the recording medium.

1 14. The hardware resource allocation method of Claim  
2 12,

3 wherein each transfer process for broadcast is a process  
4 for reading the material data from the recording medium,  
5 organizing the read material data so as to be in a format  
6 suitable for a streaming-type delivery, and performing the  
7 streaming-type delivery, and

8 each background transfer process is a process for reading  
9 the material data from the recording medium, organizing the  
10 read material data so as to be in a format suitable for a  
11 download-type delivery, and performing the down-load type  
12 delivery.

1 15. The hardware resource allocation method of Claim  
2 10,

3 wherein in the available amount calculation step, the  
4 available amount is calculated every time when one of (a)  
5 a time that is a predetermined duration before a start time  
6 of each duration shown by the duration information and (b)  
7 an end time of each duration shown by the duration information  
8 is reached.



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1 16. A program for making a nonlinear broadcast system  
2 that has a program execution function execute a hardware  
3 resource allocation control procedure, the nonlinear  
4 broadcast system broadcasting material data by executing a  
5 plurality of transfer processes of the material data for  
6 broadcast in parallel for at least a certain duration, the  
7 transfer processes for broadcast utilizing a common hardware  
8 resource,

9 the nonlinear broadcast system including material  
10 storage means storing the material data and duration  
11 information storage means storing duration information  
12 showing durations, in each of which a different one of the  
13 transfer processes for broadcast is scheduled to be executed,

14 the hardware resource allocation control procedure  
15 comprising:

16 a first allocation step for allocating a required amount  
17 of the hardware resource to each transfer process for broadcast  
18 for the corresponding duration shown by the duration  
19 information;

20 an available amount calculation step for calculating  
21 an available amount of the hardware resource remaining after  
22 the required amount has been allocated to each transfer process  
23 for broadcast in the first allocation step; and

24 a second allocation step for allocating, to one or more  
25 background transfer processes that are processes other than

26 the transfer processes for broadcast, as much amount of the  
27 hardware resource as possible, so as not to exceed the  
28 calculated available amount.

1 17. The program of Claim 16,  
2 wherein in the available amount calculation step, the  
3 available amount of the hardware resource is calculated every  
4 time when one of a start time and an end time of each duration  
5 shown by the duration information is reached.

1 18. The program of Claim 16,  
2 wherein in the available amount calculation step, the  
3 available amount is calculated every time when one of (a)  
4 a time that is a predetermined duration before a start time  
5 of each duration shown by the duration information and (b)  
6 an end time of each duration shown by the duration information  
7 is reached.